JBL Professional
Ceiling Speaker Configuration Software

OPERATING INSTRUCTIONS

Rev 1.1.0

DESCRIPTION

The JBL Pro **CSC Ceiling Speaker Configurator** provides first-pass information about which JBL Pro ceiling speaker models can be used for various in-ceiling distributed applications to achieve target sound levels in the most economical manner.

For music systems, the goal is to achieve the proper level of background or foreground music, as determined by the application type. For paging systems, the goal is to achieve proper intelligibility by allowing the level of the paging to exceed the ambient sound level by at least 10 decibels, which is the generally accepted requirement for achieving proper speech intelligibility.

Based on the target sound level requirement as defined by the user-input information above, CSC compares multiple possibilities of loudspeaker models that could be used, the required spacing for each depending on its coverage, the total number of loudspeakers, and the cost of each system.

CSC reports which loudspeaker model will achieve the sound level goal at the lowest possible cost. If it's a 70V/100V T-version speaker, it reports which tap to use for achieving the goal. It also approximates the number of speakers required for a given floor space and lists the spacing between speakers.

For systems where subwoofers are desired, CSC can advise how many subwoofers are needed to add a comparable amount of low frequency sound to match well with the main speakers.

Limitations of CSC Software vs. JBL's DSD Software

With the information CSC provides, it is possible to select a JBL Professional in-ceiling loudspeaker model and know the approximate the number of loudspeakers to use for a project. This can be very useful in a sales situation where estimates need to be completed quickly, or as a first-step in a larger engineering project to select some starting-point models to consider. However, CSC is an estimation tool. It is limited to an edge-to-edge layout density and is based on very general floor area information. Listener height is set at 4 feet (1.2 m) and is non-adjustable. Ceiling Height is selectable in whole feet or meters and maximum ceiling height range of CSC is 20 feet (and 6 meters for metric setting). It is designed to suggest the most cost-effective model to use for achieving the minimum requirements of the goal. Sound level results are correct to within about ±2 dB.

By contrast, JBL Pro's free download **DSD Distributed System Design** software is an engineering tool. DSD allows for more exacting computations utilizing additional specific information about the venue. It looks at more factors, such as the aspect ratio of the room, and provides more exact engineering results, such as exact placement locations. Listener height can be adjusted to match the application. However, DSD requires the user to already know which model of JBL loudspeaker they want to use. Therefore, DSD can be used *after* CSC, allowing the user to input the model of JBL loudspeaker that was selected by CSC as being the most cost-effective way of achieving the goal, and then allowing the user to go through various "what if?" design scenarios by choosing different loudspeaker models, taps settings, spacings, etc.

Bandwidth -- Note that neither the CSC or DSD programs take bandwidth (how much bass the speaker produces) into consideration. Some loudspeaker models produce more bass than others. If the application requires wide-bandwidth sound, then choose the speaker model that has a good bass response, or plan on adding subwoofers (use the Subwoofer Calculator).

INSTRUCTIONS

Before Starting -- Click **Speaker Configurator** and then **Preferences** to set whether you will be using English or Metric units.

Step 1 -- Click **Speaker Configurator** and then **New Configuration** to bring up the New Configuration screen.

- Enter the project name.
- Check the bubble for whether the system will be used solely for music, solely for paging, or for both.
- Read the box about 70V/100V distributed speakers vs. low-impedance (8Ω or 16Ω) speakers. If you want the results to include low-impedance speakers (in addition to 70V/100V speakers), then click the top checkbox in that section. If you want to only include low-impedance speakers, click the bottom checkbox in that section. Read the note at the bottom left about complex rooms. Click NEXT.

Step 2 -- If you selected **Music** or **Both,** the music system screen will appear. Click the bubble representing the sound level you want, based on the description in the bottom left. If in doubt between two levels, check the higher level bubble to allow the proper headroom for either level. Click NEXT.

Step 3 -- If you selected **Paging** or **Both**, the paging system screen will appear. Click the bubble most closely representing the type of application. The purpose is to determine what the typical ambient sound is that the sound system will need to overcome. If your application is not specifically mentioned, choose an application where the ambient sound level is similar to your application. Click NEXT.

Step 4 – On the **Room Dimension** screen, enter the dimensions of the room, or of the section of the room that you are modeling. *(Note that CSC does not compute based on the specific room dimensions, but rather bases its computations on the total square footage of the floorspace. For more complete computations taking into consideration the specific room dimensions, use DSD.)*

Input the **Ceiling Height**. If the speakers will be installed below the actual ceiling height, input the height above the floor at which the speakers will be installed. Click NEXT.

Step 5 – The **Results** screen appears.

- Recommended Sound Level – Based on the information you entered on the Music page, Paging page or both, CSC sets a recommended sound level. (The target paging sound level for the listed application-types comes from industry standard BS5839, Annex B.)
- Speakers Options #1,#2, & #3 – For most systems, CSC presents three possible speaker choices. Option #1 is the least expensive choice, followed by #2 and then #3.

  Matching Required Sound Level – Note that the sound level capability of some of the speaker selection Options might be lower or higher than the target sound level recommendation listed at the top of the page. Selections are made in a window that allows a few dB variation from the recommended level, to provide some trade-off choices.

  In certain situations, such as very low target sound level with only low-impedance speakers selected, actual sound level capability of the speakers could be considerably higher than the target level simply because that is the sound level capability of the designated speakers.

- Generate Report –Click the **Generate Report** button. The report contains all the information you provided as well as the speaker selections. To print the report, click **File** and then **Print.**

Generating a Report -- The **Report** contains the same information shown on the Results screen on an easily printable form.

- **Printing** -- Click **File** and then **Print.**

- **Making Changes –** To go back and make any changes, click on **File** and then **Revise Design.** That takes you back to the **Results** page, from which you can go back and make changes to any page by clicking the **Previous** button.

To adjust the design anywhere along the way, click the **Back** button.

INFORMATION

70V vs. Low-Impedance Speakers

CSC DEFAULTS TO 70V/100V (T-VERSION)SPEAKERS – Most distributed ceiling speaker systems utilize 70V or 100V distributed system speakers. CSC defaults to 70V/100V speakers unless one of the checkboxes for low impedance speakers are checked.

70V VS. 100V – The same JBL speakers can be used in either a 70V distributed systems, which is typical within US, or a100V system, which is typical outside the US. The CSC software includes all the taps available for either 70V or 100V. However, the lowest tap rating listed on the speaker for 70V usage is usually not available for 100V systems. Before committing to using a speaker at a low tap on a 100V system, make sure that model does indeed offer that tap for 100V use.

LOW IMPEDANCE SPEAKERS – Low-impedance refers to speakers in the 4Ω to 16Ω range. Advantages of low-impedance speakers include getting substantially louder than 70V/100V speakers (not being limited by the 70V/100V transformer), and achieving a wider frequency response. However, when using these speakers, impedance loading of the power amplifier must be taken into consideration, usually restricting use to a maximum of 2 or 4 speakers per amplifier channel (depending on the exact impedances of the speakers and the minimum-impedance capability of the amplifier).

Layout Density

CSC lays out speakers on an *edge-to-edge* spacing density, which is the most common and most economical density. In edge-to-edge spacing, there is very little overlap in coverage from adjacent speakers. While CSC is locked into an edge-to-edge density, tighter densities can be utilized to further improve sound quality/spaciousness, to lower sound level variations within the room, and to increase the maximum sound level capability of the system. For modeling tighter densities (Minimum Overlap and Maximum Overlap densities) use JBL Pro's DSD Distributed System Design software.

Listener Height

CSC uses a listener height of 4 feet (1.2 meters) and is not adjustable. This height is approximately correct for either seated or standing listeners.

Subwoofer Information

The subwoofer utility computes the number of subwoofers required to attain a comparable subwoofer sound level within the space in a *distributed* in-ceiling subwoofer system.

COVERAGE – The number of subwoofers selected by CSC does NOT indicate how even the coverage will be throughout the listening space, which is also an important consideration. Additional subwoofers may be necessary to achieve acceptable coverage. Ceiling-mounted subwoofers typically directly cover an area of 120 x 120 degrees. At ratios that utilize fewer subwoofers, coverage becomes an increasingly important factor to consider. In addition, while placement near walls and corners increases sensitivity, it can result in sound that is too loud close to the subwoofers and too soft away from subwoofers. As rooms get larger, it is increasingly important to cover the center of the room directly.

CROSSOVER MODE and EQ -- This chart assumes the use of a traditional active crossover that low-passes the subwoofers and high-passes the main speakers. If main speakers are being operated full-range (not high-passed), then a subwoofer/mains bump will occur in the frequency response, resulting in an overly dominant mid-bass (ie, "muddy" bass). A PARAMETRIC EQ (set with measurement software) must be utilized in the signal chain before the crossover to remove this bump. Graphic EQs typically do not have the capability of being set to the exact center frequency, nor can their bandwidth be adjusted to cover just the bandwidth that needs to be reduced without overly affecting the sound.

POWERING THE SUBWOOFERS -- Ratios for Control 312CS are based on it being operated low-impedance (8 ohms). Ratios for Control 19CS are based on it being operated either low-impedance (19CS) or at the top 60 Watt tap (19CST). It is further assumed that the subwoofers are driver with adequate power amplification to attain maximum SPL capability (for low-impedance, the power amp should be rated double the speaker continuous average pink noise power rating; for 70V/100V the power amp should be rated 20% higher than the sum of the taps). With less amplification per subwoofer, the number of subwoofers may need to be adjusted to a greater quantity (at an approximate ratio of doubling the quantity of subwoofers for each halving of the amplifier power).

USING DIFFERENT JBL PRO SUBWOOFER MODELS -- JBL Professional provides a wide variety of subwoofer choices. For systems where the chart indicates a large number of Control 312CS subwoofers, an alternative JBL subwoofer may be warranted. Choices include Control SB210, AL6115, ASB6118 or ASB6128. Be especially mindful of coverage when using fewer subwoofers (see "Coverage", above).